U.S. Patent Application No. 10/828,789
Amendment dated March 14, 2007
Reply to Office Action of December 14, 2007

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A method of sintering a valve metal powder to form a porous bonded valve metal powder comprising sintering said valve metal powder in the presence of at least one iodine source to form ~~a sintered~~ said porous bonded valve metal powder.

2. (Currently amended) The method of claim 1, wherein during said sintering, a valve metal-iodine compound temporarily forms ~~along with said sintered valve metal~~.

3. (Original) The method of claim 1, wherein said iodine source is a gas.

4. (Original) The method of claim 1, wherein said iodine source is a liquid.

5. (Original) The method of claim 1, wherein said iodine source is a solid.

6. (Original) The method of claim 1, wherein said sintering occurs in a vacuum furnace or reactor.

7. (Original) The method of claim 1, wherein said sintering occurs in a vacuum furnace that has an isolatable trap.

8. (Original) The method of claim 2, further comprising collecting at least a portion of said valve metal-iodine compound in an isolatable trap for reuse.

9. (Currently amended) The method of claim 1, wherein said valve metal powder is tantalum.

10. (Currently amended) The method of claim 1, wherein said valve metal powder is niobium.

11. (Original) The method of claim 2, wherein said valve metal-iodine compound is tantalum iodide.

12. (Original) The method of claim 2, wherein said valve metal-iodine compound is TaI_5 or NbI_5.

13. (Original) The method of claim 1, wherein said sintering is at a temperature of less than about 1200° C.

14. (Original) The method of claim 1, wherein said sintering is at a temperature of from about 350 to about 900° C.

15. (Original) The method of claim 1, wherein said sintering is at a temperature of from about 450 to about 850° C.

16. (Original) The method of claim 1, wherein said sintering is at a temperature in which the predominate sintering mechanisms comprise surface diffusion and evaporation/condensation.

17. (Original) The method of claim 1, wherein said sintering is for a time of from about 10 minutes to about 50 hours.

18. (Currently amended) The method of claim 2, wherein said valve metal powder and said valve metal-iodine compound are present in equilibrium.

19. (Original) The method of claim 6, wherein said vacuum furnace further comprises an isolatable addition system for containing an oxygen getter.

20. (Original) The method of claim 6, further comprising deoxidizing said valve metal within said vacuum furnace.

21. (Original) The method of claim 1, wherein at least one oxygen getter is present during said sintering.

22. (Original) The method of claim 21, wherein said oxygen getter comprises magnesium.

23. (Currently amended) A method of sintering a valve metal comprising sintering said valve metal in the presence of at least one iodine source to form a sintered valve metal, and further comprising deoxidizing before, during, and/or after said sintering.

24. (Original) The method of claim 23, wherein said deoxidizing is a magnesium deoxidizing.

25. (Original) A sintered valve metal formed by the method of claim 1.

26. (Original) A capacitor comprising the sintered valve metal of claim 25.

27. (Original) A method of forming a sintered valve metal, comprising:

sintering a valve metal in the presence of an iodine source within a container; and

deoxidizing said valve metal in the presence of an oxygen getter within said container.

28 – 48 (Canceled)

49. (Original) A sintered valve metal formed by the method of claim 27.

50. (Original) A capacitor comprising the sintered valve metal of claim 49.

51. (Canceled)

52. (Original) The method of claim 1, wherein said sintering occurs before any anodization.

53. (Original) The method of claim 1, wherein said sintering occurs after at least one anodization.

54 – 55 (Canceled)

56. (Currently amended) A method of making a capacitor anode comprising sintering a valve metal powder in the presence of an iodine source to form a sintered bonded valve metal powder, and anodizing said sintered bonded valve metal powder to form said capacitor anode.

57. (Withdrawn) A valve metal powder, wherein when sintered at 800°C for 6 hours and formed in an anode with a formation voltage of 60 volts and a formation temperature of 83°C has a capacitance that is at least 20% greater than the same powder being tested and formed into an anode by sintering at 1400°C for 10 minutes at the same formation voltage and same formation temperature.

58 – 65 (Canceled)

66. (Withdrawn) A valve metal powder wherein when sintered at 800°C for 6 hours and formed

into an anode with a formation voltage of 60 volts and a formation temperature of 83°C has a DC leakage that is at least 20% lower than the DC leakage obtained when the same powder is formed into an anode sintered at a temperature of 1400°C for 10 minutes at the same formation temperature and same formation voltage.

67 – 74 (Canceled)

75. (Withdrawn) A sintered valve metal body having a shrinkage diameter of 0.5% or less with an initial press density of 5.5 g/cc.

76 – 84 (Canceled)

85. (Withdrawn) A sintered valve metal body, that when formed into an anode by sintering at 800°C for 6 hours has a DC leakage of 2.0 nA/CV or less, using a formation voltage of 60 volts and a formation temperature of 83°C.

86 – 87 (Canceled)

88. (Withdrawn) A sintered valve metal body which, when formed into an anode sintering at 800°C for 6 hours with a formation voltage of 60 volts and a formation temperature of 83°C has a capacitance of at least 40,000 CV/g.

89. (Withdrawn) The sintered valve metal body of claim 89, wherein said capacitance is from 40,000 to about 250,000 CV/g.

90. (Withdrawn) A method of making a capacitor anode comprising pressing a basic lot valve metal powder into a green anode and sintering said green anode to form a capacitor anode, without a separate deoxidation step and without heat treating said basic lot valve metal powder prior to pressing into said green anode, and without any other thermal processing step.

91. (New) The method of claim 1, wherein said valve metal powder is tantalum powder having a BET of from about 0.1 m^2/g to about 10 m^2/g, a Scott density from about 10 g/in^3 to

about 40 g/in^3, a particle size from about 30 nm to about 10 microns, an agglomerate size of from about 0.1 micron to about 1,000 microns, a pore size distribution of from 0.0001 to about 50 microns, and a tantalum flow of from 70 m/g to about 300 m/g.

92. (New) The method of claim 1, wherein said porous bonded valve metal powder has a shrinkage diameter of 0.5% or less.

93. (New) The method of claim 1, wherein said porous bonded valve metal powder has a shrinkage of about 0%.

94. (New) A sintered valve metal porous body formed by the method of claim 91.

95. (New) A sintered valve metal porous body formed by the method of claim 92.

96. (New) A sintered valve metal porous body formed by the method of claim 93.